

Entry of the proposed amendment and reconsideration of the above-identified application is respectfully requested in view of the following remarks.

REMARKS

Claim 17 has been amended by incorporating the limitations of claims 24 and 30 into the claim. Thus, claim 17 has been amended to state that component (iii) is a required component and that the amount of component (i) is at least 70% relative to the total weight of (i), (ii) and (iii) as originally set forth in claim 30. Please note that claim 25 has been amended to correct dependency and to also add silver oxide as a transition metal (iii) which can be used as an alternative to copper oxide. Inasmuch as the Examiner has already considered claim 25, the limitation of silver oxide as an alternative would not require any further consideration by the Examiner.

Claims 17-30 have been finally rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (U.S. 6,379,536) in view of Aubert, et al. (U.S. 6,214,306). The Examiner states that Peters discloses a process for NO_x control in FCC in which the composition used includes a transition metal oxide having oxygen storage capability and a transition metal such as from Group 1b and/or 2b. The Examiner admits that Peters does not disclose the claimed (i) mixed of cerium and zirconium oxide in the NO_x reduction composition. The Examiner makes up for this deficiency by applying Aubert, et al. which discloses a catalyst composition based on a solid solution of zirconium and cerium oxides. The Examiner concludes that since Peters and Aubert are disclosing a similar NO_x reduction composition in a catalytic cracking process it would have been obvious to one of ordinary skill in the art at the time to

modify Peters by adding a mixed zirconium oxide and cerium oxide. The rejection is respectfully traversed.

It is still Applicant's position that the zirconium and cerium oxide composition disclosed by the secondary reference would not be found obvious to one of ordinary skill in the art for substitution into the NO_x control FCC catalyst of the primary reference of Peters. While the secondary references suggests that the cerium/zirconium oxide composition can be used in many applications such as cracking or hydrocracking, the patent does not otherwise suggest that this particular composition would have use as an additive to reduce NO_x during cracking. The patent is primarily concerned with the use of the catalyst in three-way automotive catalysts as disclosed in column 1, lines 5-20 and column 8, lines 5-7. The present application admits that mixed oxides of cerium and zirconium have found extensive use in automobile exhaust applications. The present invention however, is directed to an additive for FCC processing and for the addition of a mixed oxide of cerium and zirconium for NO_x control in FCC. One of ordinary skill in the art would not consider the cerium-zirconium composition of the secondary reference as useful in the FCC NO_x control composition of the primary reference in view of the different purposes of the references. The suggestion in the secondary reference that the mixed cerium/zirconium oxide can be used for hydrodenitritification or cracking, does not suggest applicability with copper or silver oxide for NO_x reduction during cracking. Moreover, the suggestion of using a cerium/zirconium mixed oxide in a three-way automobile catalyst does not suggest use of such catalyst in an FCC environment for NO_x reduction, nor would the results of such use be expected by one of ordinary skill in the FCC art. Catalysis is highly empirical and accordingly, one of ordinary skill in

the art would not look to the cerium-zirconium mixed oxide of the secondary reference for incorporation into the primary reference, and, in particular, in connection with copper or silver oxide, and find the result from the combination as producing expected results.

More importantly, the claims have been amended to recite a method in which the additive used in the present invention includes the mixed oxide of cerium and zirconium and an oxide of a transition metal selected from group 1b and 2b of the periodic table, in particular, copper-oxide or silver-oxide. While Peters discloses a copper or silver oxide, the patent does not otherwise suggest a mixed oxide of cerium and zirconium. The cerium oxide used in Peters is for oxygen storage. The present examples in the application clearly illustrate that a mixed oxide of cerium and zirconium greatly improves surface area retention and NO uptake retention after steaming, a typical condition of an FCC process, relative to comparative examples of 100% cerium oxide and zirconium oxide. Such results are not suggested in the secondary reference. Again, the secondary reference does not teach NOx reduction in FCC with a mixed cerium/zirconium oxide. Accordingly, it is believed that the method as set forth in claims 17-23 and 25-29 patentably distinguishes over the art of record.

Claim 17-30 have been further rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,852,298. The Examiner states that since zirconium is a known element for catalytic NOx reduction, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the '298 claims to eliminate the


acidic oxide support and include zirconium-cerium oxide for an enhanced NOx reduction. The rejection is respectfully traversed.

The purpose of an obviousness-type double patenting rejection is to ensure that two patents do not issue on the same or essentially the same claimed invention. U.S. 6,852,298 while directed to NOx reduction in an FCC process claims a specific range of ceria to an oxide of a lanthanide series element other than ceria. This range is not at all claimed in the claims of the present application. Further, applicants have clearly shown in the present examples that a mixture of cerium oxide and zirconium oxide yields improved results with respect to the stability of a catalyst relative to cerium oxide alone. Accordingly, not only are the claims of the present application and the claims of the '298 patent directed to different claimed inventions, but the addition of zirconium oxide with the cerium oxide in the presently claimed invention yield results not at all expected from the prior art with respect to FCC catalysis. Accordingly, it is believed that the obviousness-type double patenting rejection is improper and it is respectfully requested that the Examiner withdraw this rejection.

In view of the above, it is believed that claims 17-23 and 25-29 patentably distinguish over the art of record and applicants respectfully solicit favorable action on these claims.

Respectfully submitted,

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